

of the second year for a lateral conelet. The species is uninodal and bears subterminal conelets.

It is not the purpose of this article to discuss the merits of MAYR'S very interesting arrangement of *Pinus* except so far as it involves the false node and its cone, on which his section MURRAYA is mainly founded. It serves to illustrate, however, the elusive character of the "lateral cone," which should be regarded as an incident, more or less persistent, in the life of a pine, rather than as an invariable character.—GEORGE RUSSELL SHAW, *Arnold Arboretum, Jamaica Plain, Mass.*

THE GENUS ALISMA IN NORTH DAKOTA

(WITH ONE FIGURE)

As the basis for this investigation I have used BUCHENAU'S monograph.¹ According to his analytical key, *Echinodorus* has 6, 9, 12, or more stamens, and the carpels are arranged in a dense head; while *Alisma* is characterized by 6 stamens, and has the carpels placed in a circle. Consequently he has changed the name *Alisma tenellum* Martius to *Echinodorus tenellus* (Mart.) Buchenau. He refers all the other forms of *Alisma* to *A. Plantago* L. and has divided this species into three varieties: var. α *Michaletii* Aschers. et Graebn.; var. β *arcuatum* (Michalet) Buchenau; and var. γ *parviflorum* (Pursh) Torr. He says that var. *arcuatum* "is distinguished by many special small characters" from the other varieties. As will be found below, some of these differences are most conspicuous and give to the plant a peculiar aspect, and the distinguishing characters are constant and extend to all parts of the plant. I have therefore restored this variety to its former specific rank, and believe that the following will be an acceptable synopsis:

1. Pedicels forming with the scape an angle of 45° or less; styles erect, longer than the ovules *A. Plantago (aquatica)* L.
2. Pedicels forming with the scape an angle of 90° or more; styles bent outwards in a hook, shorter than the ovules *A. arcuatum* Michalet.

1. ALISMA PLANTAGO L., *vide* Engler's Pflanzenreich, l. c.—Scapes generally solitary (seldom two), 15–100^{cm} high, erect; strong, slender, fibrous, as is the whole plant, except when very young. Leaves bright green, ovate to lanceolate, with an acute apex and a rounded or cordate sometimes tapering base; petioles 2–35^{cm} long; the blades usually 7-ribbed, 5–17^{cm} long, 3–9^{cm} wide. Inflorescence a strict, large, loose, pyramidal panicle of majestic appearance, its lower part raised above the level of the leaf

¹ BUCHENAU, FR., Alismataceae. Engler's Pflanzenreich 4: no. 15. pp. 66. 1903.

tops, with a pointed, fastigiate apex. Pedicels verticillate in five or six rows, the erect rays forming secondary and tertiary verticils, each verticil subtended by three lanceolate, acuminate bracts. Petals 2-4^{mm} long or smaller, white with yellow unguis, obovate, often with two small indentations. Sepals striate with five pairs of "nerves," oval, with white hyaline margins. Stamens six, twice as long as the ovules. Styles numerous, erect, longer than the ovules. Nuts not joined inwardly, thus leaving the center of the receptacle uncovered.—Growing in wet or dry mud.

Var. PARVIFLORUM (Pursh) Torr. Fl. N. United States 1:382. 1824.—*A. parviflora* Pursh, Fl. Am. Sept. 1:253. 1816. *A. trivialis* Pursh, l. c.—Flowers small, 3-4^{mm} in diameter. Peduncles slender, thin, often bent. A broad-leaved form of this is *A. Plantago americanum* in Roem. et Schult. Syst. 7²:1598. 1830 = f. LATIFOLIUM. A representative of this variety with lanceolate leaves (= f. STENOPHYLLUM) is *A. Geyeri* Torr. in Rep. Upper Miss. 162. 1843, according to BUCHENAU, though the description in RYDBERG'S *Flora of Montana* (p. 19) would rather identify it with *A. arcuatum* Michalet.

Var. MICHALETII Aschers. et Graebn. Synops. Mitteleur. Flora 1:382. 1898.—*A. major* S. F. Gray, Nat. Arr. Brit. Pl. 2:216. 1821.—Flowers larger than in the preceding variety. Petals twice as long as the sepals. Peduncles stouter as a rule, strict.

Forma LATIFOLIUM Aschers. et Graebn. l. c. 383.—*A. latifolium* Gilib. Fl. Lith. 5:222. 1781. *A. Plantago latifolium* Kunth, Fl. Berol. 2:295. 1838.—Leaf-blades usually large, ovate, acute, with rounded or cordate (more seldom attenuate) base.

Forma STENOPHYLLUM Aschers. et Graebn. l. c. 383.—*A. lanceolatum* With. Bot. Arr. Brit. Pl. ed. 3. 2:362. 1796. *A. ranunculoides* All. Fl. Pedem. 1:243. 1785. *A. Plantago lanceolatum* Kunth, Fl. Berol. 2:295. 1898. *A. major* β *lanceolata* S. F. Gray, l. c.—A smaller plant. Leaf-blades broadly or narrowly lanceolate, acute (sometimes with a repand-attenuate base). This is a form produced by insufficient nutrition of the plant.

A. Plantago L. grows over the whole temperate part of North America, where all the different enumerated varieties and forms will be found; var. *Michaletii* extends its range also over Europe, Asia, and northern Africa.

2. ALISMA ARCUATUM Michalet, Bull. Soc. Bot. France 1:312. 1854.—*A. Plantago* β *arcuatum* (Michalet) Buchenau, Ind. Crit. Abh. Nat. Ver. Bremen 2:34. 1871. *A. Plantago* β *decumbens* Boiss. Fl. Orient. 5:9. 1884.—Scapes two to four (usually three), growing out one by one, and thus showing the highest number late in the season, always unequal in

length according to age, commonly bent in different shapes, often like an S, adscendent, strict or procumbent, 6-60^{cm} high; thick, fleshy, fragile, like the whole plant, when young, tough and leathery when old. Leaf-blades varying from broadly lanceolate to linear, tapering at both ends, usually 5-ribbed, 2-15^{cm} long, 0.5-2^{cm} wide, somewhat glaucescent; petioles 3-35^{cm} long, the length differing very much between the petioles of the same plant. The lowest part of the petiole is dilated, but only half as much as in *A. Plantago*, and with a narrow, scarious margin (*A. Plantago* has the lowest part of the petiole very much dilated and broadly scarious-margined). The inflorescence has generally a more rounded outline and apex than that of *A. Plantago*, and some or all of the leaves reach higher than the top. (At the late fruiting season the inflorescence of one of the scapes will generally reach above the top of the longest leaf.) Pedicels verticillate in two to six rows, the shorter generally thicker than the others, horizontal (or sometimes drooping), forming secondary verticils, but seldom tertiary, each verticil subtended by three lanceolate, acuminate bracts. Petals 1-2^{mm} long, light rose-colored, with the yellow spot of the unguis comparatively much larger than in *A. Plantago*, 1.5 times longer than the sepals, the upper margin often more or less fimbriated. Sepals striate, with seven pairs of "nerves," oval, with deeply rose-colored hyaline margins, often giving the predominant color to the flower. Stamens six, of the same length as the ovules. Styles numerous, bent outwards in a hook, shorter than the ovules. Nuts joined inwardly, and thus covering the center of the receptacle.—The species is subdivided as follows.

Var. **PUMILUM** Prah, Kritische Flora 2:204. 1890.—*A. Plantago arcuatum minimum* Buchenau, l. c. *A. Plantago pumilum* Notte in Sonder, Flora Hamb. 210. 1851.—With usually a single verticil (more seldom two).

Var. **LANCEOLATUM** (Buchenau) Lunell.—*A. lanceolatum* et *A. Plantago lanceolatum* auct. div.—Leaf-blade elliptic to lanceolate (seldom linear-lanceolate), acute, tapering at both ends. This is the usual terrestrial or emersed form, growing under exactly the same conditions as *A. Plantago*, and mixed with it. (*Fig. 1.*)

Var. **ANGUSTISSIMUM** (Aschers. et Graebn.) Lunell.—*A. Plantago arcuatum angustissimum* Aschers. et Graebn. l. c. p. 384. *A. natans* Poll. Hist. Pl. Palat. 3:319. 1777. *A. Plantago angustissimum* DC. Fl. Franc. ed. 3. 5:312. 1815. *A. Plantago graminifolium* Wahl. Fl. Ups. 122. 1820. *A. graminifolium* Ehrh. in Steud. Nom. 1:26. 1821. *A. angustifolium* in Opiz Böheims Phan. u. Crypt. Gew. 48. 1823. *A. graminea* Gmel. Fl. Bad. 4:256. 1826. *A. Loeselii* Gorski, Eichw. Nat. Skizze Litth. 127. 1830. *A. longifolium* Presl. Sommer Königr. Böhmen 15:xlvi. 1847.



FIG 1.—*Alisma arcuatum lanceolatum*.

A. arcuata graminifolia Casp. Schrift. Phys. Okon. Gesellsch. Königsberg 25:ii. 1884. *A. arcuata aquatica* Celak. l. c. 417.—Totally or partly submersed. All or most of the leaves swimming, linear, from a few to 100^{cm} long, without blades (or one, or a few of the leaves with a linear-lanceolate blade, either swimming, or on a stiff petiole reaching above the surface of the water). Inflorescence more or less emersed or even submersed. Where the water is getting lower, it passes into var. *lanceolatum*, and plants with linear leaves without blades (phyllodes), within three or four weeks, with the gradual lowering of the water-level or disappearance of the water, have been transformed into typical specimens of var. *lanceolatum*, according to repeated observations by myself and others.

According to BUCHENAU, *A. arcuatum* is distributed only over central Europe, northern Africa, and western Asia (to Persia and western Siberia). To this belt of territory can now be added North Dakota, where I have found var. *pumilum* along Oak Creek, near Bottineau, and the other two varieties at Leeds and York. They have been collected during the months of July and August.

In the above presentation some additions of characters have been made to the original descriptions, and also some modifications thereof, to conform with conditions existing in North Dakota; but none of them has changed the essential features of the species.—J. LUNELL, *Leeds, North Dakota*.